

Early Home Learning Environment (HLE) and Children's Cognitive Development: A Review of Empirical Studies

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How to cite this paper: Yu Sun, Mei Wang. (2022). Early Home Learning Environment (HLE) and Children's Cognitive Development: A Review of Empirical Studies. *The Educational Review, USA*, 6(9), 519-523.
DOI: 10.26855/er.2022.09.013

Received: September 15, 2022

Accepted: October 10, 2022

Published: October 18, 2022

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Abstract

Early home learning environment (HLE) has a positive predictive effect on children's cognitive development, especially early literacy and number skills. From the perspective of ecosystem theory, a theoretical model including micro-system, meso-system, and outer system can be constructed. Among the theoretical models, HLE should be regarded as a micro-system. The family structural characteristics, parents' educational beliefs and orientations, and parents' personal characteristics are in the position of meso-system, and the society and institutions are wrapped in the outer layer of these subsystems. Each layer of the sub-system interact with each other, and the result of interaction is ultimately reflected in the cognitive development of children. The early development of children will affect their subsequent educational achievement and family structure characteristics in a chain way, and then have an impact on the cognitive development of the next generation. In these processes, social support is considered an effective measure to block the intergenerational transmission of poverty.

Keywords

Home Learning Environment, Cognitive Development, Number Skills, Literacy Skills, Ecosystem Theory

1. Introduction

Children's learning and development, especially the learning of skills, is mainly related to their environment and the interaction in the environment (Tayler, 2016). In the last decade, the individual's HLE has gradually attracted extensive attention from pedagogy and psychology. The quality of HLE has been shown to be more important for child development than the environment of ECCE institutions (Lehrl et al., 2012).

1.1 The Definition and Classification of HLE

Early home learning environment (HLE) refers to a series of educational activities and resources provided by parents for the development of young children (Li, Y. W. et al., 2013), usually manifested as the provision of cognitive stimulation, promotion of rich experience, and investment of time in parent-child learning activities (Devine, Bignardi, & Hughes, 2016; Liang et al., 2020), which can be regarded as an educational process. The stimulation experience of children in different learning environments jointly leads to the formation of individual differences in different ability domains. The educational process can be divided into general educational process and specific educational process according to the content of activities. The purpose of the general educational process is to address broader environmental

factors, such as the daily activities of the family, the frequency of activities, social support and the family atmosphere. The specific educational process refers to the development of a certain field of children. For example, reading or counting activities are mainly targeted at early literacy skills and early numeracy. In this way, HLE also can be divided into Home Literacy Environment and Home Numeracy Environment according to the specific field of activities (Lin et al., 2019).

1.2 Early HLE and Children's Cognitive Development

As an important part of the micro-environment system for individual growth, HLE is the first learning environment that individuals come into contact with, which is of great significance to the development of children, especially their cognitive ability. Decades of research have shown that HLE is associated with children's cognitive development and will affect individual academic performance continuously.

Studies on the impact of HLE on children's cognitive development have mostly focused on the development of children's literacy ability (such as literacy and grammar) for quite some time. Researchers either study the predictive effect of HLE on children's early literacy skills directly, or use HLE as a mediating variable.

Nonetheless, the relevant findings discussed above are scattered across the literature and rarely integrated into a coherent framework. Most of previous reviews focus on the proximal process of HLE affecting children's mathematical achievement or language development, without considering it in a broader context. Based on the existing theoretical framework and scattered empirical studies, this study tries to put forward a theoretical model of the influence of early HLE on children's cognitive development.

2. A Theoretical Model of Early HLE Influencing Children's Cognitive Development

2.1 Literature Search and Selection

The current study only uses journal papers from the "Web of Science". The researcher used "Early Home Learning Environment" as the main topic to retrieve journal papers in the five years from 2016 to 2020, and sorted them according to their relevance. Thirty empirical high-quality papers were selected from the first four pages as the main research objects of this study. This study also refers to some other sources of literature as a supplement to the theoretical basis.

2.2 Theoretical Foundation and Model Construction

As shown in Figure 1, the construction of this model mainly draws lessons from household investment theory, ecosystem theory, life cycle theory, and effective maintenance of inequality theory.

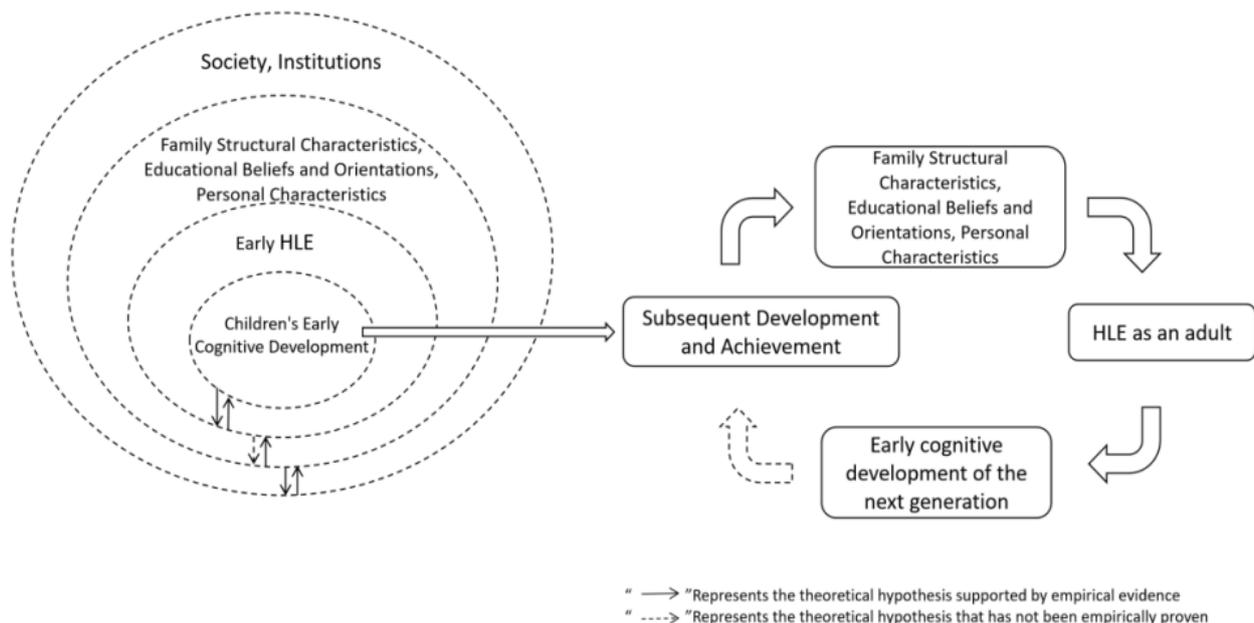


Figure 1. Theoretical Model of Early Home Learning Environment Influencing Children's Cognitive Development.

2.2.1 The influence of Early HLE on early cognitive development

There is an interaction between a positively developing person and the immediate environment in which he lives (i.e., the Microsystems), and this process is influenced by the relationships between these subsystems and the larger environment in which these subsystems are embedded. As shown on the left in Figure 1, these subsystems are not closed to each other, but can penetrate and influence each other to a certain extent

(1) The Micro-System

The micro-system is the HLE that affects children's cognitive development directly. Numerous studies have demonstrated that HLE can significantly predict the development of children's early literacy and number skills (Kluczniok & Mudiappa, 2019). HLE is positively correlated with children's language ability, and social support serves as an important background resource (Chang, 2017). HLE sets an important starting point for child development by influencing preschool children's literacy and number skills. Just as ecosystem theory suggests that there are interactions between individuals and their immediate environment, children's own characteristics can also predict the early HLE.

Although specific activities can lead to the development of specific areas, studies have shown that the literacy environment can also influence the development of early number skills. For example, a code-centric home literacy environment positively predicts children's cardinal counting, number transcoding, and calculation.

(2) The Meso-System

The meso-system refers to the factors in the family that may affect HLE, including **the Family Structural Characteristics, Educational Beliefs and Orientations, Personal Characteristics of Parents.**

SES has a great influence on the quality of HLE among the family structural characteristics. According to the household investment theory, the influence of SES on children's academic development comes from the enhancement of parents' ability to provide educational investment caused by SES. It also be pointed out that family education activities and the level of family resources invested in children's development can be used as an important basis to identify families at risk of socioeconomic risk.

Parents' attitudes and beliefs may influence their decisions and the activities they choose for their children. Parents with higher levels of educational belief were more likely to take their children to places of cultural learning (such as museums). This also demonstrates that although children with more family risk factors have poorer cognitive development (especially language development), the home learning environment, especially parental activity participation and support, can play a role in preventing risk (Kluczniok & Mudiappa, 2019). These conclusions have important implications for policy makers, early educators and families.

The personal characteristics of parents can also affect the quality of HLE. Studies shown that maternal mental health is significantly related to the quality of HLE, which in turn predicts the positive development of children's language skills (Chang, 2017). Parental depression can negatively predict early childhood literacy skills, and there is a "partner effect" between depressive symptoms and parental involvement in HLE activities, that is, higher levels of depressive symptoms in fathers are associated with lower levels of maternal involvement in HLE activities (Nuttall et al., 2019). A mother's self-efficacy in a specific area, such as language development, can enable her to provide a more supportive HLE for her child and provide more opportunities to participate in reading activities.

(3) The Outer System

In this model, the outer systems are defined as society and institutions. Current study only focuses on the indirect impact of society and institutions on children's development through influencing HLE.

As mentioned above, the mental health condition of parents will affect the construction of HLE, and it is often associated with the family's economic status and parenting pressure (Son & Peterson, 2016). At this time, adequate social support can improve the psychological health of parents and the quality of HLE, thus promoting the early development of children (Chang, 2017). For families with high financial risks, effective home visits can enable parents to better respond to children's developmental needs (Iruka et al., 2018). So policy makers and educators need to consider how to make home visits more accessible to families at greater risk.

The influence of educational institutions on HLE is realized through the interaction between parents and teachers. Communication between parents and teachers is related to the frequency of HLE activities (Lin et al., 2019). The longer the children participate in ECEC services, the more likely parents are to adjust their educational concepts and attitudes through their interactions with teachers. Especially for low-income families, the interaction between teachers and parents can effectively promote the improvement of the quality of HLE (Kuger, Marcus, & Spiess, 2019). Therefore, to strengthen the communication between educators and parents is an important measure to improve the educational concept of parents and encourage them to carry out more HLE activities.

2.2.2 The influence of Early HLE on the Individual's Subsequent Development and Achievement

As shown in the right part of Figure 1, the chain effect of early HLE on individuals can still be confirmed even

though there are few empirical studies. Early stimulation in HLE leads preschoolers to develop literacy, language, and numeracy skills, which in turn contribute to higher reading and math skills in primary or secondary school. According to the life cycle theory, early childhood development plays a key role in children's future health, educational success, and economic status. Decades of research has also made people realize that early childhood experiences determine the development of brain structure and provide the foundation for subsequent learning, behavior and health.

Meanwhile, according to the effective maintenance of inequality theory, inequality in quality of education will persist (Lucas S. R., 2001). For disadvantaged children, families' economic pressures and parents' mental health often make it difficult for them to access high-quality HLE (Kent & Pitsia, 2018; Nuttall et al., 2019). When there is no good social support to reverse this phenomenon, classes are further solidified through education, a result that will lead to persistent intergenerational educational inequality. In a study of children aged 6-42 months in Colombia, the quality of the home environment was shown to reduce the cognitive, language and other developmental gaps brought about by SES (Rubio-Codina, Attanasio, & Grantham-McGregor, 2016). Social support, especially for disadvantaged families, is therefore crucial to breaking the circle of poverty.

3. Discussion

3.1 A Review of Previous Studies

From the perspective of research content, the impact of HLE on children's development focuses on early cognitive ability. In the process of literature search, current study found that nearly 90% of the frontier studies discussed the relationship between HLE and cognitive development. However, we still know little about how the influence of early HLE on children's cognitive ability extends to children's behavioral and socio-emotional development (Liang et al., 2020). The distribution of related research contents in cognitive fields is also uneven. For a long time, most of the studies on the impact of HLE on children's cognitive development have focused on the development of early literacy (such as literacy and grammar). However, research on the influence of parents on children's early number skills is still in its infancy, and this has gradually changed over the past five years. When the relationship between HLE and children's number skills was discovered, more and more researchers turned to the perspective of HLE, especially the influence mechanism of home numeracy environment on children's math ability. However, the number of relevant studies is still less than that of early literacy.

From the perspective of research methods, previous studies mostly use cross-sectional data, while longitudinal follow-up studies on children's subsequent development are few. This may be due to the lack of longitudinal data because of the late start of research on early HLE. In addition, studies on early cognitive ability mostly focus on the development of literacy skills and number skills, ignoring the predictive role of executive function and learning quality, etc., and the rigor of research methods needs to be improved.

From the perspective of research subjects, only a few studies have explored the learning environment of single-parent families in minority groups, but in fact, samples from disadvantaged socioeconomic areas have more single-parent families (Kent & Pitsia, 2018). However, single-parent families have significantly lower HLE scores (Son & Peterson, 2016).

3.2 Limitations and Further Work

The deficiencies of this study are also very obvious. First of all, this paper only summarized and summarized the existing researches, and failed to systematically conduct quantitative meta-analysis of the research results. Secondly, the literature selected in this study is limited, and the research results of different cultures are not covered enough, so the conclusions drawn are easily affected by the lack of quantity.

For further study, First and foremost, after determining the positive influence of HLE on children's cognitive development and the internal mechanism through which this influence occurs, we should focus on how to improve the quality of HLE. For example, when exploring how the quality of HLE can be improved by more communication between educators and parents, researchers should further evaluate which aspects of communication can and should be increased. What's more, relevant research should also pay attention to the interaction mechanism between HLE and children's development in different fields (such as cognitive, emotional, social). Finally, in cases of higher parental stress, parents engaged in fewer HLE activities. Therefore, HLE of some minority groups with higher stress levels (e.g., single-parent families, LGBT families) should also be taken seriously.

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